Tuning DRF1 pinch-off

- Go to P8 DRF1 <8>

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                     PB P8  RF PARAMETERS<NoSets>
P8    DRF1 ROTATOR OFF TIMES          SET      D/A   A/D   Com-U ◆PTools◆
-<FTP>+ *SA◆ X-A/D   X=TIME      Y=D:PMAGV ,D:LNV   ,         ,
COMMAND ---- Eng-U  I= 0      I=-2000    ,-2000    ,-200    ,-20
-< 8>+  r_80 AUTO    F= 2.5     F= 2000   , 3200    , 2000   , 20
DRF_1 tunsy drf_2 drf_3 arf_1 arf_2 arf_3 arf_4 misc1 misc2 misc3

 D:R1HLFB     DRF1 Fanback Sum                      5.055  MV

-D:R1L2T3     DRF1-2 BUNCH ROT: OFF   .000043     .000043   SECS ...
-D:R1L3T3     DRF1-3 BUNCH ROT: OFF   .000039     .000039   SECS ...
-D:R1L4T3     DRF1-4 BUNCH ROT: OFF   .000042     .000042   SECS ...
-D:R1L5T3     DRF1-5 BUNCH ROT: OFF   .000035     .000035   SECS ...
-D:R1L6T3     DRF1-6 BUNCH ROT: OFF   .000033     .000033   SECS ...
-D:R1L7T3     DRF1-7 BUNCH ROT: OFF   .000044     .000044   SECS ...

-D:R1L2RL     LLRF DRF1-2 ROTATE LEVEL      6      5.985  VOLT .
-D:R1L3RL     LLRF DRF1-3 ROTATE LEVEL      6      5.985  VOLT .
-D:R1L4RL     LLRF DRF1-4 ROTATE LEVEL      6      5.935  VOLT .
-D:R1L5RL     LLRF DRF1-5 ROTATE LEVEL      6      6.015  VOLT .
-D:R1L6RL     LLRF DRF1-6 ROTATE LEVEL      6      5.93   VOLT .
-D:R1L7RL     LLRF DRF1-7 ROTATE LEVEL      6      5.935  VOLT .

-D:EROFP2     drf1-2 phase err offset    -21.2          Degs
-D:EROFP3     drf1-3 phase err offset      1.5          Degs
-D:EROFP4     drf1-4 phase err offset      9.5          Degs
-D:EROFP5     drf1-5 phase err offset     -2.3          Degs
-D:EROFP6     drf1-6 phase err offset     28.2          Degs
-D:EROFP7     drf1-7 phase err offset     10            Degs

 D:PHERR2     drf1-2 phase error                -.056  Degs
 D:PHERR3     drf1-3 phase error                -.06   Degs
 D:PHERR4     drf1-4 phase error                -.043  Degs
 D:PHERR5     drf1-5 phase error                -.105  Degs
 D:PHERR6     drf1-6 phase error                 .242  Degs
 D:PHERR7     drf1-7 phase error                 .091  Degs

 A:STCKRT     Pbar Stacking Rate                25.57  mA/h
 A:PRDCTN     PBARS PER P @ TOR109              18.81  E-6
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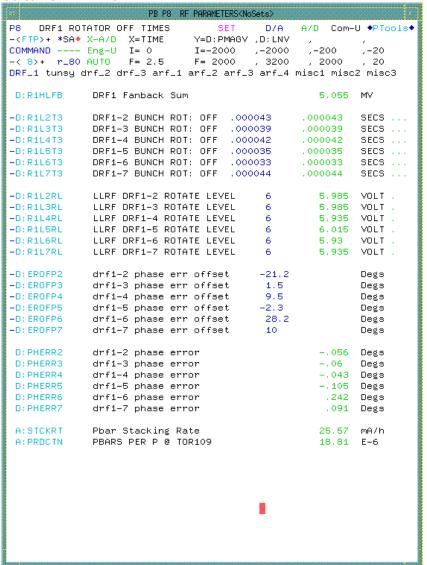
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- Tune the phase error offset.
    - Setup the scope with DRF1-2 on channel one and DRF1-# (2-7) on channel 2.
    - Add 0.00005 to the D:R1L#T3, bunch rotation off timer, for the cavity that you want to tune.
    - Change D:EROFP# in two degree steps and watch the scope to see if it improves.
    - We want D:PHERR# to be zero when the scope crosses zero.
    - There is a trick in that when the scope crosses zero, if the D:PHERR# is not equal to zero, you can make a quick change at this time. This takes some practice, but can save you time in the long run.
    - Set D:R1L#T3 back to it's original value.
- Tune bunch rotation off timer
    - Setup the scope to get a good view of the RF turning off.
    - Tune D:R1L#RT3 to minimize width of the signal after the RF turns off.
- Repeat for the other cavities
- Set the relative timing between cavities.

- Set the x-axis in the middle of the RF waveform and then blow up the scale until you can see the individual oscillations.
- Comparing two cavities, use a tweek POT to align the phases.
- If the changes are out of the range of the POT, then cabling may have to be added or removed.